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Investigating the Relationship between Financial Crises and Real and Accrual Earnings Management with Emphasis on the Effectiveness of Internal Controls of Firms Listed in the Tehran Stock Exchange

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Abstract

Objectives: This study aims to examine the relationship between financial crises and both real and accrual earnings management, emphasizing the moderating role of internal control effectiveness among firms listed on the Tehran Stock Exchange (TSE).

Methodology/Design/Approach: The research is applied in nature and employs a causal (ex post facto) correlational design. The statistical population includes all firms listed on the TSE, from which 131 firms were selected using the systematic elimination sampling method. The study covers six years from 2018 to 2023. Financial crises were measured using Altman's Z-score model, accrual earnings management was assessed through the Modified Jones Model, and real earnings management was measured using three proxies: abnormal discretionary expenses, abnormal production costs, and abnormal operating cash flow.

Findings: The results show a positive and significant relationship between financial crises and accrual earnings management, indicating that firms tend to manipulate accruals during periods of financial distress. Conversely, a negative relationship was found between financial crises and real earnings management. Furthermore, the findings confirm the moderating role of internal control effectiveness, demonstrating that strong internal controls mitigate the extent of both accrual-based and real earnings management during financial crises.

Innovation: This study contributes to the literature by providing empirical evidence on how financial crises influence managerial behavior in earnings manipulation and how robust internal control systems can serve as effective governance mechanisms in reducing opportunistic financial reporting. The findings have practical implications for regulators, auditors, and corporate managers seeking to strengthen financial transparency during periods of economic instability.

Keywords: Financial Crisis, Real Earnings Management, Accrual Earnings Management, Quality of Internal Control, Tehran Stock Exchange.

1. Introduction

When a listed firm experiences a financial crisis, its earnings may fall short of investors' expectations, leading to a decline in share price and firm value. Such crises also increase the cost of issuing debt and make financing more difficult (Cho et al., 2011). In response, firm managers may take measures to maintain the firm's image and performance, with earnings management—either through accruals or real activities—being one of the most common strategies. Previous research indicates a gradual shift from accrual-based earnings management, which is relatively easy but more likely to be detected by auditors, to real earnings management, which is less detectable (Youhani et al., 2022). However, neither method fully resolves the financial crisis in practice.

Evidence from Graham et al. (2005) suggests that managers under "negative financial pressure" may compromise the quality and honesty of financial reporting to ensure firm survival. Zhang (2012) similarly found that firms facing financial crises implement higher levels of accrual-based earnings management. The present study does not specifically examine the choice between accrual and real earnings management; rather, it focuses on the relationship between these practices and financial crises, structured around four research hypotheses that constitute the study's main objectives.

Firms engaging in real earnings management generally do not need to disclose operational adjustments, reducing the risk of detection by auditors or regulators. In contrast, accrual earnings management involves manipulating accounting figures disclosed in financial reports, making them more likely to be identified. Managers of financially stressed or bankrupt firms often resort to earnings management as a survival mechanism, unlike managers of financially healthy firms who may use it for smoothing earnings or meeting analysts' forecasts (Graham et al., 2005).

Internal control systems are established to enhance the reliability of accounting information. According to Circular 873 of the Iranian Auditing Standards, internal controls are processes designed and implemented by management and employees to achieve objectives related to financial reporting reliability, operational effectiveness, efficiency, and compliance with laws and regulations (Sepasi & Kazempour, 2015). Firms with weak internal controls are more likely to manipulate real activities, such as increasing production or reducing discretionary costs, which are difficult for outsiders to detect, compared to firms with effective controls.

Given the prevalence of financial statement fraud and the reliance of investors and stakeholders on reported financial information, managers may conceal negative news to protect their position and the firm's reputation. This underscores the importance of examining how firms facing financial crises manage earnings and the role of internal controls in curbing such behaviors. Considering inconclusive findings in prior studies and the existing research gaps regarding the types of earnings management and internal control in the context of financial crises, there is a clear need for comprehensive research in this area.

Based on the theoretical framework and characteristics of internal control regulations in Iran, it is expected that effective internal controls discourage managers from engaging in earnings management. Moreover, firms under greater financial pressure may be more motivated to manipulate revenues, highlighting the potentially stronger role of internal controls in limiting earnings management in such firms. Therefore, this study aims to investigate the application of earnings management and its types during financial crises, with a particular focus on the mitigating role of internal controls.

2. Theoretical Foundations

The literature indicates that certain circumstances, such as initial public offerings (IPOs) or breaches of debt covenants, can place managers under extreme pressure. Financially stressed firms, in particular, expose managers to critical stress, which can influence their decision-making processes and behaviors. Conceptually, a financial crisis occurs when a firm's total asset liquidation is insufficient to cover the total

claims of creditors (Chen et al., 1995). This situation may arise at any stage of a firm's life and is closely tied to the firm's future. If prolonged, it can ultimately lead to bankruptcy (Fan et al., 2013).

A central concern of the present study is understanding which measures managers adopt in such situations and whether these actions effectively mitigate the financial crisis. Prior research shows that financially distressed firms have strong incentives to manipulate earnings to achieve specific objectives, potentially misleading shareholders regarding firm performance (Graham, 2015). Accrual earnings management and real earnings management are the primary tools managers use to manipulate income (Cohen et al., 2016).

When choosing between these tools, real earnings management has become increasingly constrained due to oversight by regulatory bodies such as the Securities and Exchange Commission (SEC) and external auditors, leading managers to gradually shift toward real earnings management. Graham et al. (2005) note that accrual manipulation, often occurring at the end of the fiscal year, is easily detected by regulators and auditors. Real earnings management, conducted throughout the fiscal year, is less susceptible to oversight and may therefore be preferred. However, it remains unclear whether this preference persists during periods of financial crisis. Financially distressed or bankrupt firms may face heightened pressure, which could influence their risk-taking behavior regarding earnings management. This study seeks to determine whether firms engage in real earnings management during financial crises and whether these practices contribute to resolving the crisis or merely serve as temporary relief.

The role of internal controls is also critical. In the U.S., the Sarbanes-Oxley Act of 2002 (SOX) highlighted internal control following corporate scandals such as Enron. Since then, research has examined the impact of internal control on earnings management, with varying results. China issued its basic internal control standards in June 2008 ("China's SOX"), modeled on U.S. practices but differing in regulatory authority, implementation level, mandatory versus voluntary disclosure, and reporting content.

High-quality internal controls play a key role in guiding the decisions and performance of employees and senior managers. Internal control is not a single item or a law; rather, it encompasses all measures implemented to improve organizational processes and ensure reliable reporting (Abedini et al., 2019). Effective internal controls help answer critical questions for investors and stakeholders, such as:

1) Do proper internal controls enhance the value and reliability of financial information?
2) Does auditing internal control reports strengthen their validity?
3) Do managerial reports on internal control influence investors' decisions?

Internal control involves a continuous set of actions related to all organizational activities. Strengthening internal controls fosters achievement of firm objectives, creates confidence in reported figures, mitigates ethical and operational risks, and ensures timely and accurate financial reporting while optimizing resource use (Hajiha & Hosseinnejad, 2015; Abedini et al., 2019).

3. Research Background

Several studies have examined the relationship between financial crises, earnings management, and internal controls. Li et al. (2020) found that firms experiencing a financial crisis often resort to both real and accrual earnings management to mitigate the effects of the crisis, which lowers stakeholders' confidence in reported information. However, the implementation of effective internal controls and continuous oversight by managers can significantly reduce such profit manipulation.

Lucason et al. (2018) highlighted that factors contributing to bankruptcy risk can be identified and applied across different stages of a firm's life cycle. Their research indicated that firms often display high profitability before bankruptcy, potentially due to earnings manipulation. Similarly, Gani (2010) reported

that managers of financially distressed firms tend to adopt accrual-based strategies to reduce reported revenue, and may also engage in real earnings management through operational activities.

Corporate governance mechanisms, particularly audit committees, also play a critical role. Al-Motari et al. (2017) found that increased audit committee meetings lead to closer monitoring of executive activities, especially the CEO's, thereby strengthening internal controls. Lisich et al. (2016) showed that when CEO power is low, audit committee characteristics—such as independence and financial expertise—negatively correlate with weaknesses in internal control. However, when CEO power is high, this mitigating effect diminishes. Xu et al. (2015) also noted that high-quality internal controls limit real earnings management arising from relationship-based transactions with suppliers.

Bankruptcy prediction and financial distress have been studied extensively. Garcia et al. (2014) indicated that globalization and intensified market competition increase the likelihood of financial problems and bankruptcy. Hernandez et al. (2013) suggested that combining accounting, market, and macroeconomic variables can improve bankruptcy forecasting. Fan et al. (2013) found that in Chinese listed firms, earnings management gradually shifted from accrual to real earnings management, although high-quality internal controls did not fully constrain real earnings management during crises. Lajili and Eghal (2010) observed that financially distressed firms have shorter tenures for non-executive board members and more frequent board rotations. Chang (2009) reported that firms with fewer non-executive directors are less likely to experience financial distress, while larger board sizes are positively associated with financial crises.

Research also emphasizes the role of corporate governance and internal audit in mitigating earnings management. Eliezer et al. (2008) concluded that cohesive management structures with a higher proportion of non-executive directors improve control over financial statements and reduce bankruptcy risk. Cohen et al. (2008) found that the enactment of the Sarbanes-Oxley Act shifted managers' behavior from accrual-based to real earnings management. Agarwal and Toffler (2008) noted that various factors leading to firm failure can be predicted effectively using models such as Altman's Z-score.

Finally, Marcio Kitit and Park (2009) highlighted that intense industry competition can exacerbate intentional or unintentional manipulation of accounting profits, increasing information asymmetry between managers and investors. These findings collectively underscore the complex interplay among financial crises, earnings management, internal controls, and corporate governance mechanisms.

4. Domestic Background

Mehravar and Kargar (2020) examined the relationship between financial distress and earnings management and reported that financial statements serve as a crucial tool for investors and stakeholders. When firms face financial difficulties, they tend to manipulate earnings to maintain investor trust, and firms with higher financial insolvency exhibit greater earnings management. Similarly, Tahmasebi et al. (2018) emphasized that financial ratios derived from financial statements are key tools for comparing firms; when these ratios deviate from expected norms, managers attempt to restore them to maintain credibility.

Zalghi and Mashhour (2018) investigated both accrual and real earnings management and their impact on the transparency of accounting information. They found that real earnings management significantly affects information transparency, while accrual earnings management does not, suggesting that managers use earnings management in both financially distressed and non-distressed firms primarily to smooth profits. Namazi et al. (2018), in their study on real earnings management and bankruptcy prediction, concluded that abnormal operating cash flows and production costs are critical determinants of bankruptcy risk, with increases or decreases in these items, respectively affecting the likelihood of firm insolvency.

Audit committee characteristics have also been shown to influence earnings management and reporting quality. Lari Dasht Bayaz et al. (2018) found that the size, tenure, and financial expertise of audit committee members reduce delays in audit report submission, whereas independence and experience of committee members may increase delays. Mashayekhi and Hosseinpour (2016) reported that in firms suspected of fraud, real earnings management is inversely related to accrual earnings management, highlighting the need for higher-quality audits. Fakhari et al. (2015) confirmed a significant relationship between audit committee characteristics and earnings management through real activities, indicating the role of governance in constraining opportunistic behavior. Similarly, Sepasi and Kazempour (2015) found that the presence of an effective audit committee and an internal audit unit reduces profit smoothing, with a significant inverse relationship observed between the number of audit committee members and earnings smoothing.

Collectively, these studies underscore the critical role of financial health, real and accrual earnings management, and corporate governance mechanisms—particularly audit committees and internal audit units—in shaping the quality, transparency, and reliability of financial reporting.

5. Research Hypotheses

Based on the theoretical framework and prior empirical evidence, the study proposes the following hypotheses:

H1: There is a significant relationship between the financial crisis of firms and accrual earnings management.

H2: There is a significant relationship between the financial crisis of firms and real earnings management.

H3: Internal control moderates the relationship between the financial crisis and accrual earnings management.

H4: Internal control moderates the relationship between the financial crisis and real earnings management.

6. Research Methodology

The present study is classified as applied research in terms of its purpose, as it seeks to generate practical insights regarding the relationship between financial crises, earnings management, and internal control mechanisms in firms. In terms of research design, it is considered descriptive-causal because it examines the existing relationships among variables without manipulating the independent variables.

Given the historical nature of the data, the study employs library and archival methods to collect the required information. The statistical population consists of all firms listed on the Tehran Stock Exchange (TSE). Firms were excluded if they had fiscal years ending on dates other than March 31, changed their financial reporting periods during the study period, or lacked sufficient information to ensure comparability. Additionally, investment firms, banks, and insurance firms were excluded due to the unique nature of their financial reporting.

To ensure homogeneity and reliability of the data, 131 firms were systematically selected using a screening model, as outlined in Table 1. The study covers a period of six years, from 2018 to 2023, providing a sufficient dataset for robust analysis.

Data analysis was conducted using EViews 12 software. The hypotheses were tested using logistic regression and other appropriate statistical techniques to evaluate the relationships among financial crises, accrual and real earnings management, and the moderating role of internal control.

Table (1): How to select a statistical sample

Statistical population in 2023		541
Deductions: Firms Canceled Admission	117	
Deductions: Firms that have a stock trading stop.	59	
Deductions: Firms whose financial year does not end on March 29	74	
Deducted: Firms that entered the stock market during the research period	27	
Title: Lack of Access to Corporate Data	25	
Deductions: Investment Firms, Banks, and Holdings	108	
The final sample of the research		131

7. Research Regression Models

Four models are presented according to Johanni's (2020) research, which are related to the first to fourth hypotheses of the research, respectively:

$AM_{i,t}=\alpha_0+\alpha_1 DISTRESS_{i,t}+\alpha_2 SIZE_{i,t}+\alpha_3 OCF_{i,t}+\alpha_4 MtoB_{i,t}+\alpha_5 ROE_{i,t}+\alpha_6 GROWTH_{i,t}+\alpha_7 INV_{i,t}+\varepsilon_{i,t}$
Relation (1)

$RM_{i,t}=\alpha_0+\alpha_1 DISTRESS_{i,t}+\alpha_2 SIZE_{i,t}+\alpha_3 OCF_{i,t}+\alpha_4 MtoB_{i,t}+\alpha_5 ROE_{i,t}+\alpha_6 GROWTH_{i,t}+\alpha_7 INV_{i,t}+\varepsilon_{i,t}$
Relationship (2)

$AM_{i,t}=\alpha_0+\alpha_1 DISTRESS_{i,t}+\alpha_2 ICD_{i,t}+\alpha_3 DISTRESS_{i,t}\times ICD_{i,t}+\alpha_2 SIZE_{i,t}+\alpha_3 OCF_{i,t}+\alpha_4 MtoB_{i,t}+\alpha_5 ROE_{i,t}+\alpha_6 GROWTH_{i,t}+\alpha_7 INV_{i,t}+\varepsilon_{i,t}$ Relation (3)

$RM_{i,t}=\alpha_0+\alpha_1 DISTRESS_{i,t}+\alpha_2 ICD_{i,t}+\alpha_3 DISTRESS_{i,t}\times ICD_{i,t}+\alpha_2 SIZE_{i,t}+\alpha_3 OCF_{i,t}+\alpha_4 MtoB_{i,t}+\alpha_5 ROE_{i,t}+\alpha_6 GROWTH_{i,t}+\alpha_7 INV_{i,t}+\varepsilon_{i,t}$ Relationship (4)

7.1. Operational Definitions of Research Variables

7.1.1. The first dependent variable: Accrual Interest Management (AM)

Based on Johanni's (2020) model, we use Jones' modified model and use optional accruals according to the following scheme. In this model, we first obtain the total accruals:

$TAi,t= \Delta CAi,t - \Delta CLi,t - \Delta CASHi,t + \Delta STDi,t – DEPi,t$

TAi,t Total Accruals of the Firm i per year t

ΔCAi,t Change in the current assets of Firm I between the years t and t-1

ΔCLi,t Change in the current liabilities of Firm I between years t and t-1

ΔCASHi,t Change in Firm I cash between t and t-1 years

ΔSTi,t Change in the current share of long-term liabilities of Firm I between years t and t-1

DEPi,t Depreciation Cost of Firm i per year t

After calculating the total accruals, α1, α2, and α3, to determine the total non-discretionary accruals, we proceed from the following model:

$TAi,t /Ai,t-1 = \alpha1(1/Ai,t-1)+\alpha2(\Delta REVi,t - \Delta RECi,t) /Ai,t-1 +\alpha3(PPEi,t/Ai,t-1)+\varepsilon i,t$

TAi,t total accruals of firm i in t year

ΔREVi,t Change in Firm i's sales income between t and t-1 years

ΔRECi,t Change in Firm I's accounts receivable between years t and t-1

PPEi,t Gross Property, Machinery & Equipment Firm i per year t

Ai,t-1 Total book value of the firm's assets i per year t-1

εi,t Unknown effects of random factors in the year t

α1, α2, and α3: Estimated parameters of Firm I

After calculating α1, α2, and α3 from least squares according to the following model of non-discretionary accruals (NDAs), we proceed as follows:

$NDAi,t = \alpha1(1/Ai,t-1)+\alpha2(\Delta REVi,t - \Delta RECi,t) /Ai,t-1 +\alpha3(PPEi,t/Ai,t-1)+\varepsilon i,t$

And we obtain the optional accruals (DAs) after the NDA has been determined by the following formula:

$DAi,t = (DAi,t /Ai,t-1) - NDAi,t$

7.2. Dependent Variable II: Real Profit Management (RM)

In this study, real earnings management (REM) is measured using three components: abnormal discretionary costs, abnormal production costs, and abnormal operating cash flows, following the approach adopted in previous studies such as Yohani (2020). Each component is estimated through regression models, where the residuals represent the abnormal levels of the respective variables. The overall measure of real earnings management (REM) is then obtained by summing the absolute values of the three abnormal components. A higher value of this index indicates a greater degree of real earnings management within the firm.

$RM_{i,t}$=Ab PROD i,t+Ab DISX i,t+Ab CFO i,t

RMi,t, Real Revenue Management

AbPRODi,t is the abnormal production costs of Firm I's operating activities in the year t.

AbDISXi,t is the extraordinary discretionary expenses of Firm I in the year t.

AbCFOi,t is Firm i's unusual operating cash flow per year t.

7.2.1.Unusual Optional Fees

Discretionary expenses are what managers control by guiding the programs. In our country, such as the cost of training employees, the costs of the transportation and maintenance unit of goods, the costs of research and development, and the cost of marketing advertisements, and in our research, we defined administrative and sales expenses and general expenses as discretionary expenses. Therefore, based on the research of Yohani (2020), the abnormal discretionary cost is defined in the way we count as follows:

DISEXPi.t/ TAi.t-1= α0(1/TAi.t-1) + α1(SALESi.t/TAi.t-1) +ε i,t

DISEXP: The optional cost of firm i at the end of the year t, which includes the same administrative, sales, and general expenses.

TA: Total assets of Firm I at the end of the year (T-1)

SALES: Firm I sales during the year t: ε remaining model

7.2.2.Abnormal Production Cost:

We get the abnormal production through the following model:

PRODi,t/Ai,t-1=α0+α1/Ai,t-1+α2Si,t/Ai,t-1+α3ΔSi,t/Ai,t-1+α4ΔSi,t-1/Ai,t-1+εi,t

PRODi,t: The cost of production of firm i at the end of year t, and the result of the cost of the goods sold and the addition of changes in the inventory.

ΔSi,t: Changes in the sales of Firm i at the end of the year t.

ΔSi,t-1: Firm i sales changes at the end of the year t-1; and εi,t: the remainder of the model

7.2.3.Abnormal Operating Cash Flow:

In this study, according to Yohani's (2020) research, the following model is used to estimate operating cash flows:

CFOi,t/Ai,t-1=α0+α1/Ai,t-1+α2Si,t/Ai,t-1+α3ΔSi,t/Ai,t-1+εi,t

CFOi,t: Firm i's operating cash flows at the end of fiscal year t; and εi,t: Model remainder

7.3. Independent Variable: Financial Crisis (DISTRESS)

In this study, the most famous model of bankruptcy and crisis (Altman's model) is used to estimate the independent variable, according to the research of Yohani (2020). Altman (1968) introduced 5 ratios among different ratios that are the most effective in predicting bankruptcy in the following model:

z-score=0.3 X1 +1.0X2 + 1.4X3+ 1.2X4 + 0.6X5

X1: Ratio of net profit (earnings before interest and tax) to total assets

X2: Sales to Total Assets Ratio

X3: Ratio of Accumulated Profit to Total Assets

X4: Ratio of Net Working Capital to Total Liabilities

X5: Stock Market Value to Total Liabilities

The lower the index number for a firm, the more unfavorable its financial situation is, so firms with an

index below 1.80 are considered firms with financial crises and bankruptcy.

7.4. Modulator Variable: Internal Control (ICD)

Internal control weakness is a critical factor in facilitating fraud. Following Yohani (2020) and similar studies in the Iranian context, we measure the degree of internal control weakness using a binary variable (0 or 1). Specifically, we examine the auditor's reports submitted to the Codal website for the financial statements of the firm in the relevant year. If the auditor identifies a material weakness in internal control, the observation is coded as 1; otherwise, it is coded as 0. Additionally, the number of reported clauses indicating weaknesses in the audit report is considered a proxy for the extent of internal control deficiency. In this way, a higher frequency of reported weaknesses reflects a lower quality of internal control within the firm.

7.5. Control variables of the model

SIZE (Firm Size) Natural Logarithm of Total Firm Assets

OCF: (Cash flows) Operating Cash/Total Assets

MtoB: Market Value in Book Value of the Firm

ROE: The ratio of shareholders' earnings to total assets in the current year

GROWTH: (Sales Growth) (Current Year's Sales – Previous Year's Sales)/Previous Year's Sales

INV: Ratio of Inventory to Total Assets

8. Research Findings

The findings of the research include descriptive statistics and inferential statistics, which are presented below.

The mean represents the central tendency of the data and serves as the main indicator in descriptive statistics, reflecting where the data are concentrated. For instance, the mean value of the firm size variable is 14.47, indicating that most observations cluster around this point. Measures of dispersion provide insights into the spread of data relative to the mean, with the standard deviation being a key metric. In the present dataset, the standard deviation is 5.03 for market value in books, indicating high variability, and 0.09 for cash, reflecting low variability. The minimum and maximum values indicate the range of each variable; for example, the largest observed value of firm size is 17.33.

Table 2: Descriptive Statistics of Research Variables

Variable	Mean	Max	Min	ST.D
DISTRESS	0.21	0.000	1.000	0.41
Am	0.18	0.013	0.58	0.13
Rm	0.10	0.75	-0.44	0.31
OCF	0.10	0.05-	0.34	0.09
ICD	0.37	0.000	1.000	0.48
SIZE	14.47	17.33	12.44	1.01
MtoB	5.83	4.44	10.02	5.03
ROE	0.16	0.10	0.45	0.11
GROWTH	0.20	0.10	0.70	0.27
INV	0.22	0.019	0.52	0.11

Table 3: Durability test (unit root, Levin, Lin, and Chu) for all research variables

Variable Name	Test Statistics	Sig
DISTRESS	-2.8847	0.0000
Am	-15.9724	0.0000
Rm	-24.1242	0.0000
OCF	-25.9093	0.0000
ICD	-5.3571	0.0000
SIZE	-12.8948	0.0000
MtoB	-28.6233	0.0000
ROE	-14.0242	0.0000
GROWTH	-17.3181	0.0000
INV	-26.5554	0.0000

According to the results obtained in Table 3, it can be seen that the significance level of the variables in the durability test is less than 5% and indicating the reliability of the variables.

According to the results obtained in Table 4, it can be seen that the significance level of the test for the research models is less than 5%, indicating the acceptance of the panel data model.

According to the results obtained in Table 5, it can be seen that the significance level of the test in the research models is less than 5%, indicating the acceptance of fixed effects.

The results of Table 6 show that the variable of the financial crisis, with a positive coefficient of 0.11 and a significance level of less than 5% (0.000), has a direct and significant relationship with accrual earnings management, and the first hypothesis is accepted. The coefficient of determination is equal to 55%, which shows that the independent and control variables in the model have been able to explain 55% of the changes in the dependent variable. The Watson camera statistic is equal to 1.81, which indicates the absence of self-correlation between the variables.

The results presented in Table 7 indicate that the financial crisis variable has a negative coefficient of -0.21 and a significance level below 5% ($p = 0.000$), demonstrating a significant and inverse relationship with real earnings management. Consequently, the second hypothesis is supported. The model's coefficient of determination (R^2) is 0.52, indicating that the independent and control variables collectively explain 52% of the variation in the dependent variable. Additionally, the Durbin-Watson statistic is 1.87, and the overall model significance is below 5%, confirming that the regression model is valid and there is no evidence of autocorrelation among the residuals.

Table 4: Results of the F. Limmer test

Test Model	Test Statistics	Significance level
The first hypothesis (model)	4.43	0.0000
The Second Hypothesis	4.44	0.0000
The Third Hypothesis	4.42	0.0000
The Fourth Hypothesis	4.42	0.0000

Table 5: Hausman Test Results

Test Model	Test Statistics	Sig
The first hypothesis (model)	30.83	0.0000
The Second Hypothesis	43.19	0.0000
The Third Hypothesis	38.12	0.0000
The Fourth Hypothesis	39.01	0.0000

Table 6: The result of the first hypothesis test.

$AM_{i,t}=\alpha_0+\alpha_1 DISTRESS_{i,t}+\alpha_2 SIZE_{i,t}+\alpha_3 OCF_{i,t}+\alpha_4 MtoB_{i,t}+\alpha_5 ROE_{i,t}+\alpha_6 GROWTH_{i,t}+\alpha_7 INV_{i,t}+\varepsilon_{i,t}$				
Dependent Variable: Accrual Earnings Management				
Variables	**Coef**	**Stdev**	**T Statistic**	**Sig**
DISTRESS	0.11	0.020	5.81	0.000
SIZE	-0.09	0.031	-3.00	0.002
OCF	-0.06	0.07	-0.83	0.40
ROE	-0.15	0.08	-1.90	0.05
MtoB	-0.00	0.001	-0.31	0.74
GROWTH	0.023	0.016	1.38	0.16
INV	-0.15	0.10	-1.43	0.15
View from the Principal	1.51	0.46	3.29	0.00
Determination Coefficient	55%			
Watson Durbin	1.81			
F statistic	0.000(5.55)			

Table 7: The result of the second hypothesis test

$RM_{i,t}=\alpha_0+\alpha_1 DISTRESS_{i,t}+\alpha_2 SIZE_{i,t}+\alpha_3 OCF_{i,t}+\alpha_4 MtoB_{i,t}+\alpha_5 ROE_{i,t}+\alpha_6 GROWTH_{i,t}+\alpha_7 INV_{i,t}+\varepsilon_{i,t}$				
Dependent Variable: Real Profit Management				
Variables	**Coef**	**Stdev**	**T Statistic**	**Sig**
DISTRESS	-0.21	0.03	-6.76	0.000
SIZE	0.19	0.04	4.08	0.000
OCF	0.19	0.11	1.61	0.10
ROE	-0.30	0.12	-2.37	0.018
MtoB	0.003	0.001	1.68	0.091
GROWTH	0.053	0.025	2.05	0.040
INV	-0.10	0.16	-0.65	0.51
View from the Principal	-2.66	0.71	-3.73	0.000
Determination Coefficient	52%			
Watson Durbin	1.87			
F statistic	0.000(5.09)			

Table 8: Result of the Third Hypothesis Test

$AM_{i,t}=\alpha_0+\alpha_1 DISTRESS_{i,t}+\alpha_2 ICD_{i,t}+\alpha_3 DISTRESS_{i,t}\times ICD_{i,t}+\alpha_2 SIZE_{i,t}+\alpha_3 OCF_{i,t}+\alpha_4 MtoB_{i,t}+\alpha_5 ROE_{i,t}+\alpha_6 GROWTH_{i,t}+\alpha_7 INV_{i,t}+\varepsilon_{i,t}$				
Dependent Variable: Accrual Earnings Management				
Variables	**Coef**	**Stdev**	**T Statistic**	**Sig**
DISTRESS	0.059	0.028	2.13	0.03
ICD	0.13	0.036	3.81	0.000
DISTRESS×ICD	0.13	0.049	2.74	0.006
SIZE	0.002	0.010	0.27	0.78
OCF	0.003	0.077	0.043	0.96
MtoB	0.001	0.009	1.36	0.17
ROE	-0.11	0.076	-1.54	0.12
GROWTH	0.053	0.025	2.05	0.040
INV	-0.04	0.079	-0.56	0.57
View from the Principal	0.11	0.15	0.74	0.000
Determination Coefficient	58%			
Watson Durbin	1.90			
F statistic	0.000(5.17)			

The results presented in Table 8 indicate that the interaction term financial crisis × internal control has a positive coefficient of 0.13 and a significance level below 5% (p = 0.006), suggesting that internal control

significantly moderates the relationship between financial crisis and accrual earnings management. Consequently, the third hypothesis is supported. The analysis further shows a direct and significant relationship between internal control weaknesses and accrual earnings management: greater weaknesses in internal controls facilitate earnings management, while stronger and higher-quality internal controls restrict managers' ability to manipulate financial statement items and reduce accrual earnings management. The model's coefficient of determination (R^2) is 0.58, indicating that the independent and control variables collectively explain 58% of the variation in accrual earnings management. Additionally, the Durbin-Watson statistic is 1.90, and the overall model significance is below 5%, confirming that the regression model is valid and there is no evidence of autocorrelation among the residuals.

The results presented in Table 9 indicate that the interaction term financial crisis × internal control has a positive coefficient of 0.26 and a significance level below 5% (p = 0.001), demonstrating that internal control significantly moderates the relationship between financial crisis and real earnings management. Consequently, the fourth hypothesis is supported. These findings suggest that when firms maintain high-quality internal controls and ensure adequate supervision of managerial activities from the outset, the board of directors and institutional agents effectively prevent the use of real earnings management techniques. As a result, the firm is less likely to experience a sudden financial crisis or conceal internal events. The model's coefficient of determination (R^2) is 0.52, indicating that the independent and control variables together explain 52% of the variation in real earnings management. Moreover, the Durbin-Watson statistic is 2.14, and the overall model significance is below 5%, confirming that the regression model is valid and that there is no evidence of autocorrelation among the residuals.

Table (9): Result of the Fourth Hypothesis Test

$RM_{i,t}=\alpha 0+\alpha_1 DISTRESS_{i,t}+\alpha_2 ICD_{i,t}+\alpha_3 DISTRESS_{i,t}\times ICDi,t+\alpha_2 SIZE_{i,t}+\alpha_3 OCF_{i,t}+\alpha_4 MtoBi,t+\alpha_5 ROE_{i,t}+\alpha 6 GROWTH_{i,t}+\alpha 7 INV_{i,t}+\varepsilon_{i,t}$				
Dependent Variable: Real Profit Management				
Variables	**Coef**	**Stdev**	**T Statistic**	**Sig**
DISTRESS	-0.40	0.041	-8.60	0.000
ICD	0.10	0.06	1.66	0.096
DISTRESS×ICD	0.26	0.082	3.20	0.001
SIZE	0.02	0.017	1.64	0.10
OCF	0.15	0.13	1.22	0.22
MtoB	0.001	0.001	1.19	0.23
ROE	-0.28	0.12	-2.22	0.02
GROWTH	0.053	0.025	2.05	0.040
INV	-0.37	0.13	-2.82	0.004
View from the Principal	0.108	0.011	9.29	0.000
Determination Coefficient	52%			
Watson Durbin	2.14			
F statistic	0.000(3.93)			

9. Research Conclusion

The purpose of this study is to investigate the moderating role and effectiveness of internal controls on the relationship between financial crises and both accrual and real earnings management. The estimated coefficient of the financial crisis (bankruptcy) variable is positive, and the calculated t-value for this variable is significant at the 5% level, indicating a meaningful

relationship between the variables at the 95% confidence level. Given that financial crises are considered an independent variable, it can be concluded that when firms fail to meet their objectives in the capital market, or encounter crises for reasons beyond the sole responsibility of the firm or its managers, managers may resort to manipulating financial statements—particularly accounting profits, which serve as a key indicator of firm performance for market participants.

Statistical analysis of 131 firms listed on the Tehran Stock Exchange shows that firms experiencing severe financial crises are more likely to have managers motivated to conceal information or pursue personal gain through earnings manipulation. It can also be argued that, in practice, severe financial crises and bankruptcy may be both a cause and consequence of earnings management: when firms manipulate profits and other financial statement elements, these actions can accumulate and, once revealed, trigger financial crises, bankruptcy, and a decline in share prices. Managers facing crises often act to protect their interests, primarily through accrual earnings management. Therefore, more severe financial crises are associated with higher levels of accrual earnings management. These findings are consistent with the studies of Lee (2020) and Mehravar & Kargar (2020).

Conversely, the estimated coefficient for financial crises and real earnings management is negative, indicating an inverse relationship between the two variables, with significance at the 5% level. This suggests that managers are less likely to engage in real earnings management during periods of financial crisis or bankruptcy. Managers tend to manipulate real items before the firm reaches a critical crisis state, anticipating that the firm will remain stable and avoiding exposure to auditors and stakeholders. When a firm is already in a severe crisis, managers focus on accrual earnings management to present financial statements in a normal state and mitigate the perception of crisis. These results align with the research of Lee (2020), Khajavi et al., and Pour Zamani & Pouyan Rad (2011).

The estimated coefficient of the internal control's variable on the relationship between financial crises and accrual earnings management is positive and significant at the 5% level, confirming the moderating role of internal controls. Effective internal controls act as a pressure or regulatory lever that reduces accrual earnings management in critical situations. Firms with robust internal controls, including oversight over supervision, cash management, and operational procedures, are less likely to experience financial crises or engage in fraudulent earnings management. Strong internal controls ensure that financial reporting reflects the firm's realities, reducing information asymmetry between managers and stakeholders.

Furthermore, enhanced internal control quality also affects real earnings management. The positive coefficient indicates that higher-quality internal controls improve the management of the relationship between financial crises and real earnings management, promoting efficiency and preventing fraudulent practices. Overall, the study finds that firms prefer accrual earnings management during crises due to time constraints and the immediate need to stabilize financial statements, while real earnings management requires sufficient time and long-term planning. The results underscore the importance of effective internal controls in preventing earnings management and mitigating the impact of financial crises.

In conclusion, all corporate factors—including crises, internal control weaknesses, types of earnings management, and characteristics of managers, boards, auditors, and audit committees—form an interconnected system. Weakness in any of these factors can compromise the firm's overall integrity. Therefore, managers, board members, and shareholders should ensure that internal controls are robust and effective to prevent financial misreporting and reduce the likelihood of earnings manipulation. These findings are consistent with the studies of Cohen et al. (2008), Fan et al. (2013), Su et al. (2015), Lee et al. (2020), and Fahimnejad et al. (2020).

10. Practical Research Suggestions

Based on the results of the first and second hypotheses, it is recommended that managers seek safe and proactive solutions to address potential future financial crises, rather than relying on accrual manipulation or real earnings management, which may exacerbate crises for the firm in the long term.

According to the findings of the third and fourth hypotheses, managers are advised to establish effective internal control systems to ensure comprehensive oversight of organizational activities. Strong internal controls reduce the risk of fraud and earnings manipulation and can help prevent financial crises by accurately monitoring and managing the firm's operations.

Investors should pay attention to the auditor's opinion regarding weaknesses in a firm's internal control when making investment decisions, comparing current information with past data to identify potential financial statement manipulation and assess the firm's bankruptcy risk and overall reliability.

Providing investor education through the Securities Exchange Organization on investment principles, types of financial fraud, and earnings management, along with publicizing the results of internal control assessments, can further enhance investor awareness and decision-making.

Investors are also advised to carefully review all aspects of firms' financial statements when evaluating stock investments.

Finally, it is recommended that managers, before their firms enter financial crisis or bankruptcy zones, implement adequate supervision and strategic internal control plans. By doing so, they can avoid falling into financial distress and ensure that profit management practices are not used for personal gains, such as bonuses, and that financial statements remain accurate and reliable.

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